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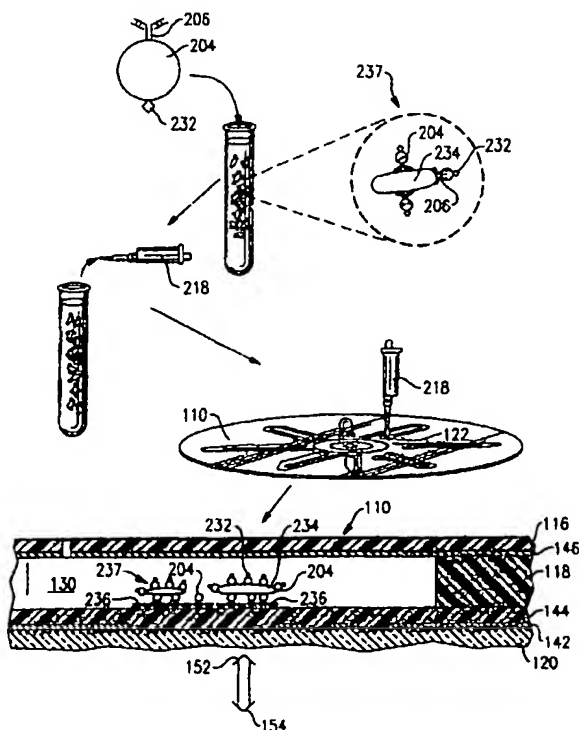
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[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR USE IN DETECTION AND QUANTITATION OF VARIOUS CELL TYPES  
AND USE OF OPTICAL BIO-DISC FOR PERFORMING SAME



(57) Abstract: Methods and apparatus for conducting differential cell counts including leukocytes and use of optical bio-discs for performing such cell counts is disclosed. The bio-disc includes a substantially circular substrate having a center and an outer edge, an active layer associated with the substrate; a target zone disposed between the center and the outer edge; and a plurality of capture antibodies bound to the active layer such that the antibodies are immobilized on the active layer in the target zone.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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## INTERNATIONAL SEARCH REPORT

Inter .. ial Application No

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N33/569 G01N33/543 G01N35/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N

Documentation searched other than minimum documentation: to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, EMBASE, BIOSIS, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 311 492 A (SANOFI SA) 12 April 1989 (1989-04-12)  the whole document in particular page 3, lines 45-57; page 5, lines 30-62; page 6, line 65 - page 7, line 5; Example 2 and 3.	1-8, 11-14, 21-38
Y	WO 03/006956 A (GLENCROSS DEBORAH KIM ; NAT HEALTH LAB SERVICE (ZA); UNIV WITWATERSRAN) 23 January 2003 (2003-01-23) the whole document in particular page 6, line 1 - page 7, line 3; Example 1.	1-8, 11-14, 21-38



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

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\*P\* document published prior to the international filing date but later than the priority date claimed

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\*&amp;\* document member of the same patent family

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WO 02/44695 A (BURSTEIN TECHNOLOGIES INC) 6 June 2002 (2002-06-06)</p> <p>the whole document in particular page 5, lines 4-25; page 10, lines 1-15; page 11, line 27 - page 12, line 7; page 15, line - page 18, line 22; page 21, lines 6-27;</p>	1-8, 11-14, 21-38
Y	<p>US 2002/076804 A1 (KIEFFER-HIGGINS STEPHEN G ET AL) 20 June 2002 (2002-06-20)</p> <p>the whole document in particular Figure 2; paragraphs 38-39, 41, 48, 100, 174-176</p>	1-8, 11-14, 21-38
Y	<p>WO 00/05582 A (BURSTEIN LAB INC) 3 February 2000 (2000-02-03)</p> <p>the whole document in particular page 110-117.</p>	1-8, 11-14, 21-38
A	<p>US 2002/072078 A1 (LIU JIUAN ET AL) 13 June 2002 (2002-06-13)</p> <p>the whole document</p>	1-8, 11-14, 21-38
A	<p>US 5 348 859 A (COULTER WALLACE H ET AL) 20 September 1994 (1994-09-20)</p> <p>the whole document</p>	1-8, 11-14, 21-38

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2004/002780

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1-8, 11-14, 21-38

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8,11-14,21-38

A bio-disc comprising a target zone having immobilised thereon capture antibodies, said antibodies binding to a surface marker common to different populations of cells (i.e. target and non-target cells). Methods for detecting subpopulations of cells in a sample using said bio-discs by tagging said subpopulations with antibodies specific for the target subpopulations.

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2. claims: 9,10,15-20,39-50

A bio-disc having one or a plurality of capture antibodies immobilised in a target zone. The nature of the capture antibodies is not defined. Methods for detecting target cells in a sample using said bio-discs.

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3. claims: 51-54

A method for detecting target cells, wherein capture antibodies are immobilised on a bio-disc using a pair of affinity binding agents. The capture antibody is incubated with the target cells prior to application of the sample to the bio-disc.

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/ 004/002780

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0311492 A	12-04-1989	FR 2621128 A1 AT 103711 T AU 2294888 A CA 1340973 C DE 3888779 D1 DE 3888779 T2 DK 550288 A EP 0311492 A2 ES 2053785 T3 FI 884472 A ,B, HK 1001570 A1 IE 63426 B1 IL 87882 A JP 1121755 A KR 126236 B1 NO 884327 A ,B, PT 88615 A ,B US 6461825 B1	31-03-1989 15-04-1994 06-04-1989 25-04-2000 05-05-1994 08-09-1994 31-03-1989 12-04-1989 01-08-1994 31-03-1989 26-06-1998 19-04-1995 14-01-1993 15-05-1989 24-12-1997 31-03-1989 31-07-1989 08-10-2002
WO 03006956 A	23-01-2003	WO 03006956 A2 JP 2004533855 T US 2004197768 A1	23-01-2003 11-11-2004 07-10-2004
WO 0244695 A	06-06-2002	AU 4160202 A WO 0244695 A1 US 2003104486 A1 WO 02051537 A2 US 2002168652 A1 US 2003077598 A1	11-06-2002 06-06-2002 05-06-2003 04-07-2002 14-11-2002 24-04-2003
US 2002076804 A1	20-06-2002	US 6319468 B1 US 6143247 A US 2004142494 A1 AU 5895898 A WO 9828623 A1	20-11-2001 07-11-2000 22-07-2004 17-07-1998 02-07-1998
WO 0005582 A	03-02-2000	US 6200755 B1 AU 5080699 A CA 2338401 A1 EP 1097378 A2 HU 0103577 A2 JP 2002521666 T WO 0005582 A2 US 2003054376 A1 US 6342349 B1 US 2002106661 A1	13-03-2001 14-02-2000 03-02-2000 09-05-2001 28-01-2002 16-07-2002 03-02-2000 20-03-2003 29-01-2002 08-08-2002
US 2002072078 A1	13-06-2002	NONE	
US 5348859 A	20-09-1994	US 5340719 A AU 2008992 A BR 9206033 A CN 1067118 A EP 0585385 A1 IL 101826 A JP 6507971 T WO 9221027 A1 AU 652599 B2	23-08-1994 30-12-1992 29-11-1994 16-12-1992 09-03-1994 31-01-1996 08-09-1994 26-11-1992 01-09-1994

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT. 04/002780

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5348859	A	AU 9091091 A	25-06-1992
		CA 2096502 A1	24-05-1992
		CN 1062212 A	24-06-1992
		EG 19765 A	29-02-1996
		EP 0558639 A1	08-09-1993
		HU 67053 A2	30-01-1995
		IL 100124 A	31-12-1995
		JP 6503171 T	07-04-1994
		MX 9102194 A1	30-06-1994
		NO 931763 A	15-06-1993
		WO 9209878 A1	11-06-1992
		US 5554505 A	10-09-1996
		ZA 9109253 A	24-05-1993

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